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ABSTRACT

To determine the relationship between reading comprehension and the measures of logical judgement and concepts of language, forty-one adult basic education students were tested using the California Achievement Test and Peel's tests of logical judgement. The findings include the following: (1) concepts of language structure vary in adults; (2) the degree of success on the language concepts measure covaries with the reading level for adults in a basic education program; (3) logical judgement was not found to be related to achievement; and (4) the results were similar across sex and ethnic groups. (EM)

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The Measurement of Logical Judgements in Adults

(A research study aimed at adaptation of tasks for the measurement of logical judgements in adults.)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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CREA

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ABSTRACT

This paper focuses on the impact of a student's cognitive level on general comprehension. An attempt has been made to examine: a) the utility of Peel's tests of logical judgement with ABE students in New York State; b) the relationship of the measure of logical judgement to the measure of reading comprehension; c) the relationship of the measure of concepts of langugage structure to reading comprehension; and d) the relationship of logical judgements to various demographic variables. Forty-one ABE students of various ethnic groups, who also varied in their reading levels, were selected for the study. The materials used were the California Achievement Test and Peel's tests of logical judgement. Major findings indicate that degrees of similarities and differences exist across demographic levels.

SUMMARY

The major findings of this study were:

(1) concepts of language structure vary in adults

(2) degree of success on the language concepts measure covaries with reading level for adults in a reading skill development program

(3) good interrater reliablity was attained for the tasks logical judgement

(4) logical judgement, as assessed by the stimulus materials and the rating scheme employed, was not found to be related to achievement

(5) the results were found to be generally similar across sex and ethnic groups

(6) differences by age were attributed to a peculiarity of the specific sample tested

(7) when demographic variables were included in the factor analysis, the factors observed included one factor which described interrelationships of sex, age, and ethnic status in this sample, and one factor each for achievement, language concepts, and logical judgements, with language concepts also loading on the achievement factor.

IMPLICATIONS

The primary purpose of this project was to select or devise a means of tapping cognitive levels in adults. The secondary purpose was to determine whether such a measure was related to reading comprehension. If they were found to be related, it was anticipated that cognitive level might later be used to place adults for instructional purposes, using different tactics for adults at various levels.

An instrument was selected, tried out, revised, and used again. A rating system for the logical judgement was developed, tried out, and revised. Two raters were trained to use the system and applied it to each of the subjects' responses to each of the seven stories. Interrater reliability was high, breeding confidence in the reliability of this measure. The validity of the measure could not be fully assessed within the limits of the present study, but it seems best to describe the Peel tasks as assessing logical judgements in social content. It may be that tasks similar in format but more similar in content to the achievement tests would show stronger relationships. The logical tasks are of interest in themselves, and deserve further study.

The other limitations which should be noted is that the California

Achievement Test does not necessarily ask very searching questions. Higher level cognitive functioning may be irrelevant to performance on low-level comprehension questions. In addition the comprehension subtest includes some items (such as map-reading) marginally relevant to the type of comprehension of interest here. It may be desirable at some later point to reanalyze the data, relating it to a "cleaned up" comprehension task with irrelevant items excluded, or to use in another study a measure requiring higher levels of comprehension. As of now, however, the conclusion must be that adults' performance on the Peel tasks for logical judgement is unrelated to performance on the California Achievement Test.

With this strong reservation in mind, it may nonetheless be true that awareness of the logical processes assessed by the tasks used in this study could be a "tool" concept for the teacher. The concept of qualitative differences in logical judgement may help a teacher to understand why a student is having difficulty in co-ordinating information from a lesson. If a student typically performs on test and nontest materials at a relatively low level, the teacher would probably contribute most to his growth by using questions which draw out from the student mostly facts and low level inferences, and occasionally lead him to a slightly higher co-ordination of information.

On the other hand, if a student shows capability for higher cognitive operations, the teacher might occasionally use open-ended interpretive or evaluative questions that stimulate the student and legitimize his use of these skills in reading. These curricular implications may be examined in another year. The relationship of reading comprehension and logical ability is likely to be of greatest importance at the lowest ability levels and the highest levels of difficulty of content or questions. It may be necessary to refine the measure used for comprehension as well as the measure of logical judgement, and to attempt to specify more closely the conditions of "readability" and question type under which differences in coginitive levels affect performance.

While no single study can answer all questions, this study and several other recent studies using the Peel tasks with high school and junior high school students may suggest directions to be pursued in our search for understanding of psychological factors related to the development of comprehension in the adult learner.

Final Report:

COGNITIVE LEVELS IN ADULT BASIC EDUCATION STUDENTS

I. Background

This report consists of two parts: one dealing with the process of examining adults' cognitive levels used in language comprehension and the other with the product, the study executed and analyzed by this process.

The activities involved were (a) literature search; (b) gathering more pertinent literature; (c) consultation with personnel involved; (d) development of a tentative plan for evaluation of cognitive processes in ABE students; (e) execution of the study; and (f) analysis and interpretation of results.

The literature search covered theoretical and empirical studies of cognitive style, cognitive complexity and cognitive development in adolescents and adults.

Kelly's and Bieri's version of cognitive complexity seemed relevant to discriminating among adult learners' structuring perceptions of their world; and thus related to their ability of ABE students in dealing with comprehension at literal, inferential, and creative levels. Bieri's modification facilitated automation of data and their analysis. However, the relationship of cognitive complexity and reading comprehension may be somewhat indirect.

The Piagetian viewpoint of individual and group differences in logical development seems related to the fact that reading material differs in the degree to which it specifies or implies relationship among facts. Undoubtedly, most Paigetian tasks have little to do directly with comprehension tasks.

Related to Piaget's work is the work of Peel in Britain, by the help of which adolescent and adult responses to simple questions on a passage can be categorized into several levels of judgement. Peel's levels of judgement have been categorized as follows;

Logical Judgement	Comprehension
• Irrelevant or distorted	(word-calling only)
• Judgement based on one fact-conflicting information ignored	Literal
• Judgement based on two or more facts	Inferential
• Facts related to the reader's other knowledge	Creative

Peel's passages and questions were Americanized for use as a research instrument to be field tested with ABE workshop participants. Responses yielded useful insight into res-

ponse tendencies, scoring issues, comments on suitability of reading level and content for ABE and GED students.

The next stage was an interview with the director and staff of Schenectady Adult Learning Center for evolving evaluation strategies which consisted of (1) Peel's logical judgements; (2) concepts of langugage structure; and (3) California Achievement Test scores.

The first phase involved a broad exploration of theoretical bases and operational procedures for analysis of cognitive levels in adults. The second phase consisting of development and field testing of an instrument and related measure was then undertaken.

II. Logical Judgements, Language Concepts and Reading Comprehension in ABE Students

With the passage of time, most children achieve at least literal and inferential comprehension skills. Time, however, is not so helpful to adults.

Many adults have difficulty when faced with increasing demands for inferential and interpretive comprehension

skills. Readability of the material and the type of question are said to affect comprehension in addition to the effect of the reader's characteristics and general cognitive level. This paper focuses on the impact of a student's cognitive level on general comprehension. Not all adults achieve the highest cognitive levels. There are also level differences caused by cross-cultural variables and those in the familiarity level. Also there is evidence that reading is a cognitive activity, hence the need for developing the adult learner's cognitive strategies to cope with its demand.

The objectives of the present study were to examine:

A) the utility of Peel's tests of logical judgement with adult basic education students--not only inter-rater reliability, but the ease of training raters, the degree to which specific characteristics of the various passages appear to affect responses;
B) the relationship of the measure of logical judgement to the measure of reading comprehension. Although logical judgement was hypothesized to relate most sharply to long-range ability to succeed on higher levels of comprehension (data unavailable), it would

be expected to show a moderate positive correlation with current status on reading comprehension;

C) the relationship of the measure of concepts of language structure to reading comprehension; and

D) the relationship of logical judgements to various demographic variables--age, sex, ethnic group, and number of years of schooling prior to entering the program.

METHODS

Subjects: 41 Adult education students ranging in age from 16 to 62, mean age 25; predominantly lower SES; 10 Black males, 6 Black females, 20 Caucasian males, and 5 Caucasian females, ranging in reading level from nonreader to 13-0, mean reading level 7-1; Schenectady Adult Basic Education Center.

Materials: Reading comprehension was tested using the California Achievement Test. Materials for testing logical judgement consisted of seven paragraphs adapted from Peel's tests of logical judgement. After reading the passage to the subject, the examiner asked the subject to make a judgement and then to explain his reasoning.

Scoring: It was felt useful to derive a scoring system somewhat more specific than that which Peel has provided, and to derive scoring guides for each passage as well as general guidelines. Scoring was not based on the answer to the first question but to certain aspects of the reasoning displayed in the total response. The results examined here were rated 0-3 on each of two dimensions:

I. Coordination of Information

0- Supporting neither position with relevant evidence or arguments.

1- Supports one position with relevant arguments.

2- Supports both sides with some relevant evidence, but does not coordinate them, or states that the answer cannot be determined.

3- Resolves contradiction with relevant evidence, or specifies why the answer cannot be determined.

II. Data Source Used

0- Uses only irrelevant facts or none; or essentially restates the question.

1- Uses facts from the story or inferences which are little more than paraphrases or simple associations or cliches.

2- Goes beyond the facts in the story with inferences which are related to the facts but extend beyond the facts given.

3- Analyzes the paragraph to note irrelevancies or missing data.

With seven passages rated 0-3, a subject's total scores on each of these dimensions could range from 0-21.

RESULTS

The results are organized in terms of:

1. means and distributions and other relevant characteristics of performance on
   a) logical judgement;
   b) achievement; and
   c) conservation of linguistic structure.
2. the interrelationships of each pair of these variables:
   a) logical judgement and achievement;
   b) logical judgement and language concepts; and
   c) language concepts and achievement.
3. factor analysis and multiple regression in which the interrelationships of the three main variables, along with certain demographic variables, were displayed.

Logical Judgements

The mean ratings across all stories were 1.52 (Rater 1) and 1.54 (Rater 2) of a possible 3.00 for Co-ordination and 1.70 and 1.74 for Data Source. The mean ratings for the two raters were similar within each scale for each story. The mean ratings for Data Source were higher than for Co-ordination on all stories except 'Runner'. The standard deviations ranged from 0.6 to 0.9 for most ratings on most stories, though they were slightly lower

for the Data Source dimension of 'Sisters' and slightly higher for the Co-ordination dimension of 'Pilot'.

Examination of the frequency distributions for ratings confirms and clarifies the picture presented by the means. For Co-ordination, there were very few subjects rated as Level 0 (supporting neither position with relevant evidence or arguments), a large proportion rated as Level 1 (supports one side), and a few at Levels 2 and 3. For Data Source there were again few Level 0 responses, but approximately equal numbers at Levels 1 and 2, and a few responses at Level 3.

Raters indicated that scoring Co-ordination was quite easy but that the difference between ratings of 1 and 2 on Data Source required some thought. The distribution of rating for Co-ordination was rather sharply peaked, with 40-60% of the subjects being rated as Level 1 (supports one side of a question). Specific characteristics of the passages appeared to influence somewhat the likelihood of Level 3 responses.

The distribution of ratings for Data Source formed a flatter curve. While 35-45% of the responses were categorized as Level 1, nearly as many were rated as Level 2; and 20-30% were rated Level 3 which required that the subject analyze the paragraph to note

irrelevancies or missing data.

Interrater reliability was examined at three levels:

a) between raters across all stories on each scale

b) between raters within each story on each scale

c) between each rater for each story on each scale

Interrater reliability between raters across all stories was quite acceptable. For Scale 1, Co-ordination, interrater reliability was .92. For Scale 2, Data Source, interrater reliability was .88. The moderate correlations on the off-diagonal indicate that although interrater agreement is greatest within a given scale, there is some generality. The responses of Rater 1 on Scale 1, for example, correlate .66 with those of Rater 2 on Scale 2.

Generally, high interrater reliability was maintained within all stories on each scale except Scale 2 on the story 'Sisters'. Most other interrater correlations for each story were .90 or better.

Although there was good agreement between raters on the rating scales within each story, the correlations between stories were low to moderate. This indicates that a subject's rating on one story often bore little relationship to his score on other stories.

For example, the correlation of Rater 1's rating for Co-ordination on the story 'Skating' with ratings on the same scale by the same rater for other stories were:

'Skating'/'Lynn', r = .38, p .01; 'Skating'/'Sisters', r = .12, NS

'Skating'/'Jane', r = .27, p .05; 'Skating'/'Runner', r = .25, NS; 'Skating'/'Pilot', r = .26, p .05

The report then includes data on factor-structure for Peel's Logical Judgement Rating on each of the seven passages from Peel.

By way of achievement, the greatest rate of increase was seen for students initially at the lowest levels. This was not necessarily the most rapid increase, since some of these students had had many hours of instruction.

The means of conservation of linguistic structure for adult sample as a whole were comparable to the pattern for fifth graders. Factor analysis of the major variables and demographic variables is dealt with in greater qualitative and quantitative details, which have been summarized below.

This summary of the final report has been prepared by Mr. Dilnawaz Siddiqui, a graduate assistant in the Clearinghouse.

The complete report is available to New York State Residents from CREA on two-week loan

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